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Insuring the present . . . and the future

AS IN THE PAST SO IN THE FUTURE

ALL ACTIVITIES OF THE AMERICAN TUNABOAT ASSOCIATION

ARE DIRECTED TO IMPROVEMENT AND PROSPERITY

OF THE TUNA INDUSTRY

Sam Crivello, president *Harold F. Cary, manager*

AMERICAN TUNABOAT ASSN.

No. 1 Tuna Lane

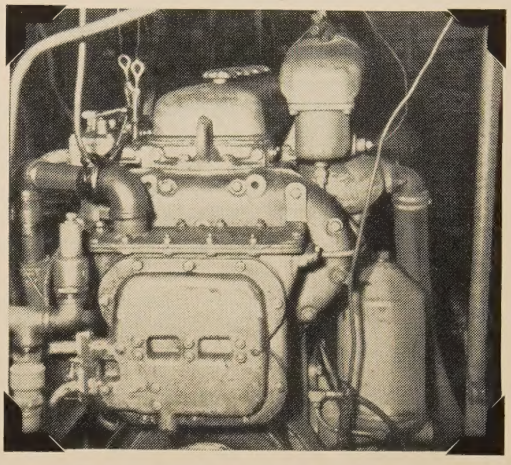
San Diego, California

STANDARD ENGINEER'S REPORT

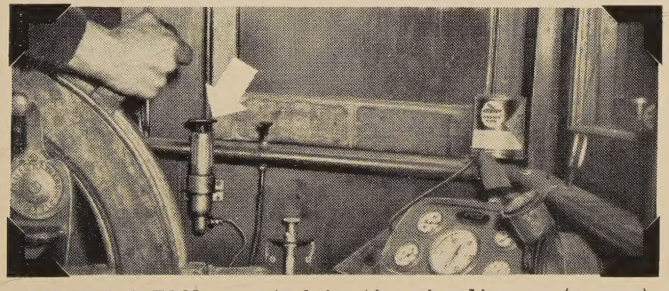
DATA

PRODUCT	Chevron Starting Fluid
UNIT	160 H.P. diesel engine
CONDITIONS	Zero weather — emergency service
EQUIPMENT	Permanent primer with atomizer on manifold
FIRM	Elliott Bay Tugboat Co., Seattle, Wash.

Starting fluid ends excessive battery expense!

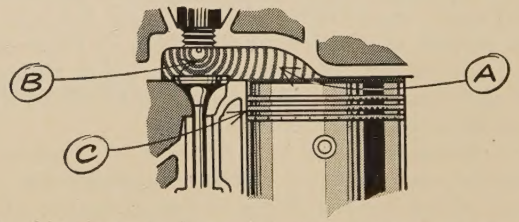


BEFORE USING CHEVRON STARTING FLUID, it took an electric heater and sometimes even a blowtorch to get this diesel boat engine started. Batteries ran down so fast that it was necessary to maintain special charging equipment. With Chevron Starting Fluid, the engine now starts on the first turn, even at zero temperatures. Needless expense has been eliminated since batteries now rarely require charging. In addition, time saving is from ½ to 2 hours per day.



PUNCTURING TOOL mounted in the wheelhouse (arrow), holds gelatin capsule of Chevron Starting Fluid. Fluid from the capsule is pumped through atomizers into the manifold. Chevron Starting Fluid is available in 3-pint cans, and 7- and 17-cc capsules. Your fluid supplier has complete primer equipment.

How CHEVRON Starting Fluid Starts Gasoline and Diesel Engines Instantly



A. Atomizes in lowest temperatures and provides powerful, easily ignited vapor in combustion chamber.

B. Pressure, or the weakest spark, fires mixture—turns engine and heats air for regular fuel mixture.

C. Contains lubricant and additives—inhibits cylinder wear and ice formation in primer equipment.

HOT NEWS for COLD ENGINES

FREE BOOKLET gives you more facts on Chevron Starting Fluid—shows where it should be applied in different type engines. Write or ask for it today.

CHEVRON STARTING FLUID

TRADEMARK REG. U.S. PAT. OFF.

STANDARD TECHNICAL SERVICE checked this product performance. For expert help on lubrication or fuel problems, call your Standard Fuel and Lubricant Engineer or Representative; or write Standard Oil Company of California, 225 Bush St., San Francisco.

STANDARD OIL COMPANY OF CALIFORNIA

The GLOBE

An International News File compiled from FOREIGN REPORTS by Marine Press Association

Copenhagen, Denmark—The Danish Minister of Fisheries and permanent Under-Secretary of the Fisheries Ministry plan to leave for the United States on October 10 for a 10-day visit, during which they will discuss with Danish Ambassador De Kauffmann the assignment to the Danish Embassy in Washington of a fishieries attache. The Danes are not yet certain where they will station the new attache, who will be accredited not only to the United States but also to Canada and the Central American republics. It is felt now that his office will be either in New York or Chicago, states a September 24 American Embassy dispatch from Copenhagen.

These present plans have resulted from recent increases in fish exports to the United States. Their value during January-July 1952 were more than double that of the similar 1951 period (US$1,289,000 as compared with US$503,000). These exports are expected to increase further under a new dollar premium plan. Not only are Danish fisheries interested in the establishment of the new post but also the Greenlandic fishing industries. Press stories, appearing on September 21, about the government's plans stated that the Minister of Fisheries would talk to American food editors and would take the opportunity to draw attention to the Danish and Greenlandic fishery products.

Panama City, Panama—Live tuna-bait fishing in Panama waters is permitted only between February 1 and September 30 of each year by virtue of the provisions of Article 5 of Executive Decree No. 330 issued June 7, 1952. Therefore, the closed season began October 1 and will end January 31, 1953, according to an October 8 dispatch from the American Embassy in Panama. This announcement was issued by the newly-appointed Panamanian Minister of Finance and Treasury on October 6. Consequently, the Minister of Finance will not issue the sailing permits required for bait fishing in Panamanian waters; and served notice to the effect that all vessels found bait fishing during the closed season will be rigorously dealt with as provided for by law.

Simultaneously, the new Minister of Agriculture, Commerce, and Industries publicly requested the commandant of the National Police to take possession of and turn over to his ministry any tuna boats that might be found bait fishing during the current prohibited season, whether they be fishing clandestinely or under the guise of so-called special licenses. **Special permits issued prior to October 1 by the former Minister of Agriculture, Commerce and Industries will not be recognized as valid.**

Aside from the financial losses which may possibly result to some tuna-boat owners and/or captains from having purchased these special licenses that will not now be recognized, this apparently firm decision of the Panamanian government to maintain the closed season on bait fishing—from October 1 to January 31—will be a keen disappointment to United States tuna-boat interests generally. The 1952 tuna season is understood to have been a rather disappointing one, at least so far as nearby Pacific waters are concerned.

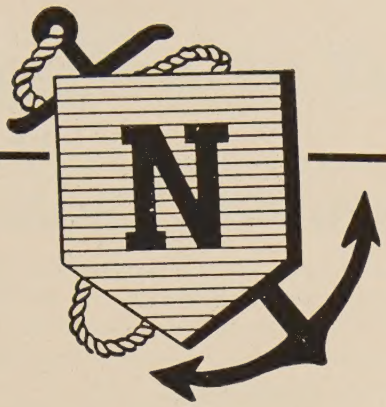
Tokyo, Japan—The success of Japan's first postwar salmon expedition in the North Pacific from May through July 1952 has resulted in renewed interest in this fishery for 1953, states an October 8, 1952, dispatch from the American Embassy in Tokyo.

The three Japanese fishing companies which had jointly engaged in the 1952 expedition are discussing preliminary plans for next season's operations. The 1952 expedition consisted of 3 motherships (1 of 3,600 gross tons, and 2 of 500 gross tons each), 50 catcher boats, 2 inspection vessels for patrol duty, and 2 research vessels. The total 1952 catch was approximately 2,100,000 fish.

Although no definite plans have been made for salmon fishing in 1953, the current discussions include the following points: (1) Desire for an independent rather than a joint operation. (2) A shorter season (end of May to end of July). (3) Larger motherships and more catcher boats. (4) Improvements in gear, including greater use of synthetic fibre gill nets which proved superior to natural fibre nets in the 1952 season. (5) More careful selection of first-rate catcher boats. (6) Operations in which western waters of the North Pacific which, in 1952, proved more productive than the eastern waters (off the Aleutian Islands).

Quito, Ecuador—Executive Decree No. 00160 dated January 29, 1952, prohibited foreign flag fishing vessels from fishing in Ecuadoran continental territorial waters. Executive Decree No. 1376 dated July 15, 1952, amended the earlier Decree to exempt foreign flag fishing vessels working for companies which have valid contracts with the Ecuadoran government. The decree of July 15 refers only to companies which have contracts with the government, so presumably they could be either national or foreign, reports an October 7 dispatch from the American Embassy at Quito. However, this decree was put through at the request of a national company which is owned by United States interests. It is on the basis of Decree No. 1376 and also article 9 of the company's contract of February 6 (published in the Registro Oficial of the same date) with the Ecuadoran government that foreign flag vessels are permitted to fish for this company in Ecuadoran continental waters. However, according to article 9 of the company's contract with the government, this privilege expires February 6, 1953.

St. Johns, Newfoundland—The uncertainty of drying and salting fish in Newfoundland, particularly in hot humid weather, consumes more of the fishermen's time than supplying fish for filleting plants. The latter allows fishermen more time for fishing or other occupations, states an August 28 American Consular report from St. John's. A fairly strong market for fillets is reported, and the tendency toward a gradual but sure transformation in fishing methods continues, since more fish at less cost and work with greater financial returns to fishermen is bound to be the goal. In the other hand, only those Newfoundlanders who feel that their destinies are tied to the sea are going to stick to their nets in the face of more remunerative employment ashore, now that the industrialization of the island is relatively under way.



Congratulations and our very best wishes for continued success, to **FRENCH SARDINE COMPANY,** whose new packing plant is a great contribution to the advancement of the tuna packing industry.

National Steel and Shipbuilding Corporation, which supplied all of the structural steel, is proud to have had a part in this outstanding achievement.

NATIONAL STEEL AND ★ SHIPBUILDING CORPORATION

HARBOR DRIVE at 28th **SAN DIEGO 12, CALIFORNIA**

PAN-AMERICAN *fisherman*

VOL. VII — No. 5

DECEMBER 1952

"NEWSmagazine of PAN-AMERICAN FISHERIES combined with the magazine TUNAfisherman"

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About this Issue . . .

BEHIND THE COVER

Pan-American Fisherman blushes modestly at sporting a four-color cover this issue, but the credit goes to Mr. D. P. Loker, of French Sardine Company, Terminal Island, California. The Ektachrome, showing the main entrance and lobby of this Company's new Star-Kist plant was made by David S. DeCamp, of Long Beach, Calif.

•

Doctor Wilbert M. Chapman, director of research for the American Tunaboat Association, comes through again this month with an additional discussion on the territorial sea. See Regime of the Territorial Sea on Page 7.

Gerald V. Howard, senior scientist of the Inter-American Tropical Tuna Commission, offers the benefit of studies conducted on the all-important bait-fishes of the tuna fleet.

•

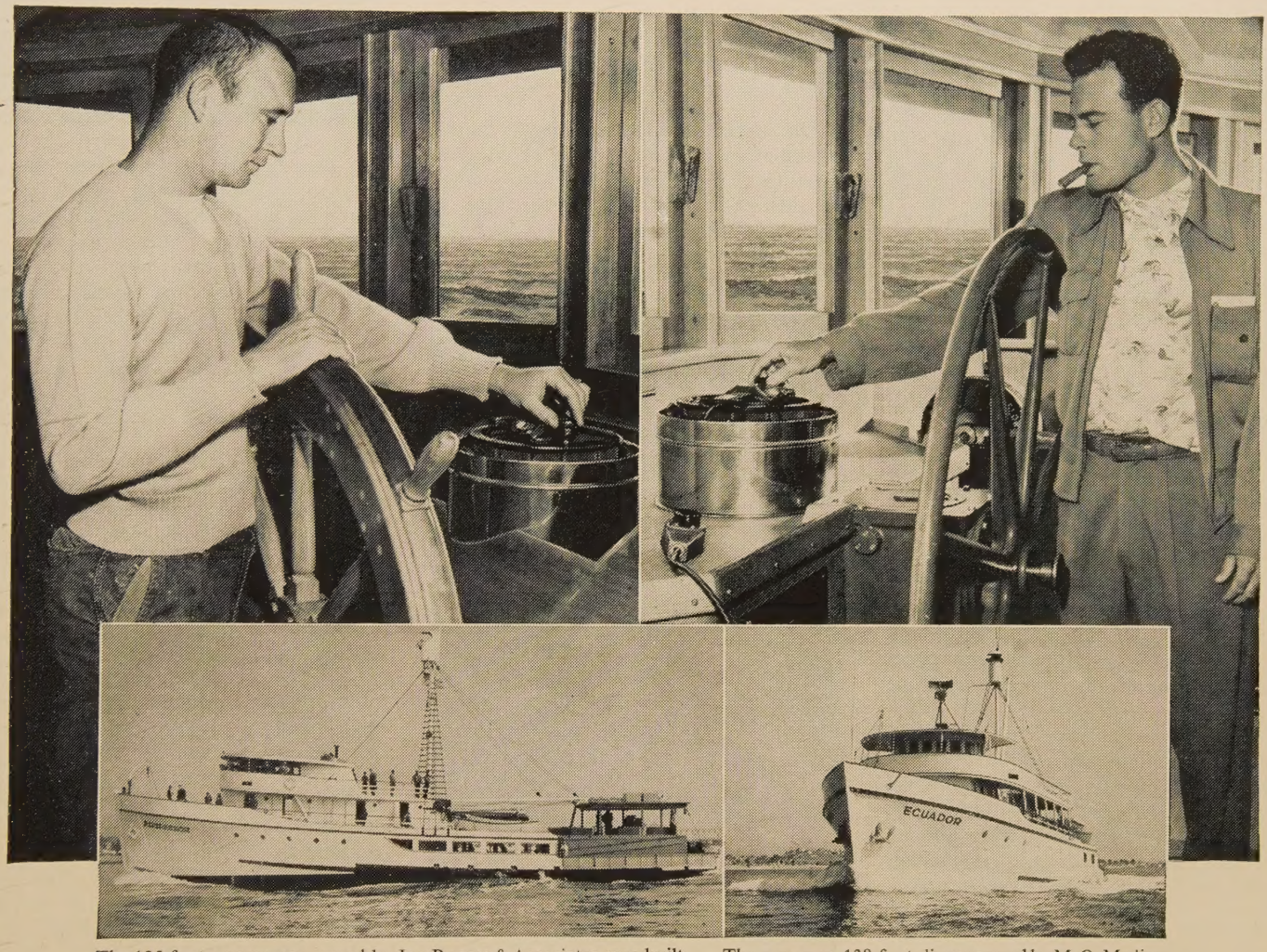
Pan-American Fisherman takes pride and considerable pleasure in presenting to the public the Star-Kist Sory—The Story of the World's Largest Tuna Packing Plant. We were fortunate in being able to get the services of one of the foremost consulting and design engineers in the West to write the story of the building of this plant. See Page 15 for the Star-Kist Story.

Beeline to Tuna ... WITH SPERRY MAGNETIC COMPASS PILOT

The skippers of the AGGRESSOR and the ECUADOR are the latest to acclaim the Sperry Magnetic Compass Pilot's remarkable ability to save hours and miles for tuna clippers on every trip.

Captain Ben Maughan of the AGGRESSOR—back from her three-months' maiden voyage—reports the Magnetic Compass Pilot "a wonderful instrument for both calm and heavy weather. To and from the fishing grounds it saved us many miles by its *perfect steering.*" The convenience of the remote controller for maneuvering also won his acclaim.

"Faultless" is how **Eugene Cabral**—the ECUADOR's captain—refers to the Magnetic Compass Pilot's operation on the long trip from San Diego to Balboa Canal Zone and the Galapagos Islands. "We found"—he said—"that we could absolutely depend on it to keep a steady course as set. My crew and I were pleasantly surprised with its unfailing accuracy." Captain Cabral estimates that automatic straight steering saved him many extra hours of engine operation—8 to 10 hours on the return trip from the Galapagos Islands alone.



The 125-foot AGGRESSOR, owned by Joe Rogers & Associates, was built by Martinolich Shipbuilding Company

The ECUADOR, 138-foot clipper owned by M. O. Medina, was built by National Steel & Shipbuilding Corp.

TIME, FUEL, MANPOWER, MONEY SAVED FOR EVERY TYPE OF FISHING CRAFT

These reports further verify the dependability and economy of Sperry automatic steering for all types of fishing vessels. Following the set course *automatically*, it saves time *en route* and on the fishing grounds—functions perfectly in all seas—frees more men for fishing. The remote controller permits steering outside the wheelhouse—gives the skipper more time to supervise fishing operations. Every Magnetic Compass Pilot is backed by Sperry's dependable service.

SPERRY GYROSCOPE COMPANY
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Editorial

ARTIFICIAL BAIT may be the ANSWER

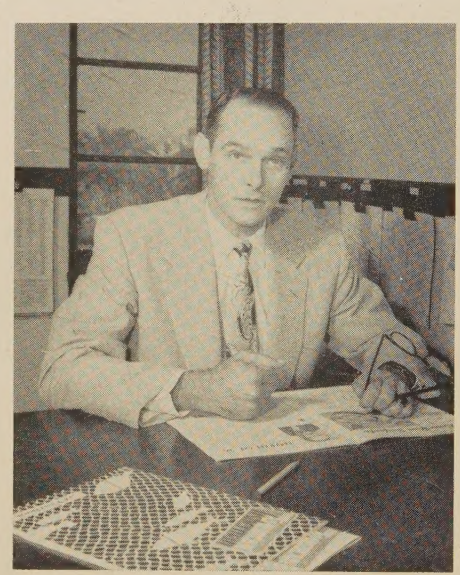
IF YOU will look into statistics of yield you will find that catching tuna by the live bait method is, hands down, the most efficient of any method in use in the world to catch tuna. This is true if you are talking in terms of catch per man year, catch per boat ton year or any other statistic of catch. And the live bait method as perfected by American clipper men in the Eastern Tropical Pacific is considerably more efficient than it is as used by the Japanese in the Western Pacific. There are few fisheries in the world that can approach the live bait tuna fishery operated by Americans in the Eastern Pacific in the efficient use of manpower or vessel operation per ton of fish caught.

This type of fishery has the single fault that it requires the operation of a second large fishery, that for the live bait, in order to prosecute the tuna fishery. The large tuna clippers many times have to run hundreds of miles from the tuna grounds to get new bait. They have to stand idly by for days while the smaller auxiliary skiffs catch the bait. The expense of carrying the bait alive on the tuna clippers is one of the largest costs of clipper operation when the repair bill of the complex machinery needed to do this with is counted in.

The live bait now in use is found nearly entirely within the territorial waters of foreign countries. The cost of acquiring licenses to fish for bait in these waters has been climbing steadily since the war in the face of declining tuna prices. International political difficulties impair the fleet's ability to use these bait resources efficiently.

But an overriding, basic difficulty with the present use of live bait is that it ties the fleet down close to shore. Postwar researches show tuna to be truly pelagic fishes found wherever oceanic conditions are right, and that these situations are found at distances hundreds and thousands of miles from land as well as close to the beach. But the economics surrounding the present use of live bait has kept the fleet tied fairly close to shore, unlike the tuna they hunt.

Obviously the practical answer to this problem is to devise, invent, or discover substitutes for anchovetta which will be as satifactory for stimulating tuna to strike at the fisherman's squid and will not have the economic and technical handicaps that anchovetta have.



Several research approaches to this problem are being stimulated by the industry. One of these has developed in such an exciting manner that its preliminary results were announced the other day in the local newspapers by the United States Fish and Wildlife Service.

The Service in its Pacific Oceanic Fishery Investigations in Hawaii has cooperated with scientists of the University of Hawaii in studying the feeding reactions of tuna confined in huge pools in the reef. One of the several channels of investigation being followed was to determine whether the tuna's sense of taste or smell was important in getting it to feed.

The answer to this, found a year ago, was yes. But a spectacular result came accidentally out of the studies, as is often the case with research. A chemical was discovered that threw the tuna into a feeding frenzy, affecting tuna much as catnip affects cats. The chemical could be concentrated so that a few drops of it on the water would stimulate tuna a hundred yards and more away. The chemical was not affected by heat, could be stored in liquid form for long periods without losing its strength, and was obtainable from tuna scrap, for it was a compound found in tuna.

Just how this is to be applied in catching tuna has not yet been worked out. Ocean trials will be conducted beginning next spring. What the cost will be is not yet known. Further chemical research is being rushed along aimed at finding a method of cheaply synthesizing the chemical in bulk quantities.

Many steps still remain between the experimental success and the practical use of the success by fishermen. But the important thing is that the research is under way. Any nation that can revolutionize the rubber industry with synthetic rubber, the silk and the wool industries with synthetic fibers like nylon, orlon, etc., and that can cap the atom bomb with the hydrogen bomb should have no great trouble in solving a small problem like getting a tuna to strike at a squid without a live anchovetta spurring him on.

Our congratulations go to the scientists in Hawaii for the rapid strides they have made in their researches. Perhaps one of the methods being worked on by other groups of scientists will be the practical thing. Perhaps two or three of these methods will be combined in the end to give the fisherman his practical substitute for anchovetta. But to Dr. A. L. Tester of the University of Hawaii, Dr. O. E. Sette, of the U. S. Fish & Wildlife Service in Hawaii and their colleagues goes the garland for producing the most promising break in the problem.

REGIME of the Territorial Sea

By

DR. W. M. CHAPMAN

W. M. Chapman
Director of Research
American Tunaboat Association

ALMOST everybody who amounts to anything in international circles these days, and some who do not, are tinkering around with the international law on the regime of the high sea, territorial waters, etc. Nobody is more directly affected by all of this than the American tuna fisherman. Most of the people around the world who are considering these matters do so in the cloister or the ivory tower. We people in the tuna business consider them from this practical viewpoint: who is the next fellow who will seize one of our vessels, what will he seize it for, what will he do with it when he seizes it, how much will we have to pay to get it back again and get it fishing and earning its keep once more?

It is manifestly impossible to expect the fishermen to keep up to date on all these things even though they affect him so directly. If he attempted to keep up with all the written material that comes out on these subjects he would have no time for fishing. Once in a while something appears that is authoritative, concise and fairly straight forward. These we can put before the fishermen for him to ponder.

In the July and August issues of the Pan-American Fisherman we set out excerpts of a recent report on this subject by the International Law Commission to the General Assembly of the United Nations, and we took the liberty of making comments from the viewpoint of the tuna fishermen on certain points raised therein.

There has now arrived another report that throws even better light on these abstruse matters. It is the "*Report on the Regime of the Territorial Sea*" by J. P. A. Francois, Special Rapporteur, to the International Law Commission. This report has many fine things about it.

In the first place Mr. Francois, a Frenchman, knows what he is talking about and he has no special ax to grind that is visible. He has been dealing with this branch of international law skillfully and intelligently for thirty odd years. He was rapporteur of the Second Committee to the famous 1930 Conference for the Codification of International Law. This Conference failed in its major objective because the nations could not agree on how wide the band of territorial sea should be. Mr. Francois has been plugging along at this problem steadily since that time.

Secondly, this report was drafted after the decision of the International Court of Justice had rendered its decision in the Anglo-Norwegian Fisheries Case. This decision settled certain aspects of this branch of international law, because the word of the court is law. It also profoundly disturbed other aspects of this branch of international law because the decision was not clear on many points and some nations have rushed in with their own interpretations and begun enforcing them. Mr. Francois has worked the chief results of this decision into his report, which makes it particularly timely.

Thirdly, Mr. Francois has wisely made his report in the form of a draft agreement which would serve to codify this section of international law if nations would sign it. This form of treatment results in a clarity and simplicity seldom found in documents dealing with this subject. The entire twenty-three articles of this draft regulation are reproduced at the end of this discussion. Mr. Francois has also interspersed comments on each of these articles through his report. His comments are cogent and succinct. They explain the historic and legal reasons for each article. They are, however, too long to be reproduced here. Anyone desiring a complete copy of Mr. Francois' report can obtain it from Mr. Charles Carry, Fishery Products Division, National Canner's Association, 1133 20th Street, N.W., Washington, D. C.

It should not be assumed that the articles of this draft agreement represent international law on the subject. They will only do so if they are adopted by the community of nations. They do, however, represent up to date thinking on this matter by an expert and they will undoubtedly bear weight on decisions made by responsible governmental bodies on this subject.

The following comments coming from the tuna fisherman's viewpoint can be made on such of these articles as affect our business.

Article 2 would establish definitely that the sovereignty which a nation exercises over its territorial waters is subject to certain conditions prescribed by international law and is not, therefore, absolute. Following articles set forth some of these conditions, such as the rights of passage through the territorial sea, etc., but the article is made broad enough to cover other conditions not set forth in this report. This article is of basic importance to the tuna fisherman.

Article 3 serves to separate definitely the legal status of jurisdiction over the sea bed from that of the water above the sea bed. One of the most vexing post-war activities on this subject has been proclamations by nations attempting to establish for themselves identical jurisdiction over the sea bed and the sea adjacent to their coasts. A major stumbling block to this joint action is that the resources of the water are migratory from one nation to another, whereas those of the sea bed are stationary. Accordingly they do not lend themselves to identical legal treatment.

(*Continued on page 21*)

EBB 'n FLOW

SOUND FISH-LOCATING EXPERIMENTS

First phases in a research project to investigate possibilities of locating schools of fish by listening for them on underwater sound detecting devices were carried out this summer in the Gulf of Maine and adjacent waters. This project was carried out under contract between the U. S. Fish & Wildlife Service and the Old Dominion Research and Development Corp. of Erica, Va. The work was directed by the Branch of Commercial Fisheries' Electronics Scientist stationed at the University of Miami Marine Laboratory. The corporation furnished technical personnel, the vessel, the crew, and designed and built some of the equipment used. The president of Old Dominion acted as master of the *Bowdoin* in addition to his professional duties.

The work was done aboard the 88-foot auxiliary schooner, *Bowdoin*, a vessel well-known for her many Arctic exploratory voyages. The *Bowdoin* was chartered from her owner, Captain Donald B. MacMillan of Provincetown, Massachusetts, and outfitted with special electronic equipment for listening to, amplifying and recording underwater sounds in a frequency range from 10 cycles per second to 100,000 cycles per second. Some echo ranging and echo sounding equipment was also carried.

During the months of August and September, numerous cruises were made from Gloucester, Boston, and other New England ports to locate schools of commercially valuable fish, such as tuna and mackerel. When such schools were found, the hydrophones were put over the side and the sounds picked up in the water were amplified and recorded on magnetic tape recorders installed on the vessel. It is well known that certain marine animals make characteristic identifying noises. If this is found to be true of commercial species of fish, it may offer an efficient means of locating them.

A number of recordings were made near schools of fish, primarily bluefin tuna and mackerel. Unfortunately only a few schools of tuna were sighted due to the fact that apparently this species did not show up in New England waters this year in as large numbers as have been reported during previous years. Recordings were made at night in Massachusetts Bay on schools of mackerel which were found by the phosphorescent glow they produced in the water.

The recordings will be analyzed in the laboratory to determine if they contain sounds made by the fish. If the analysis shows that there are characteristic noises associated with a school of tuna or mackerel, additional work will be undertaken to develop special devices for use by commercial fishermen that will be particularly sensitive to these sounds. It would be a simple matter to arrange the device so that a signal light would flash in the pilot house whenever the fishing boat passes within range of a school, either at or beneath the surface, thereby reducing considerably the time spent in looking for fish.

NORWEGIANS USE HELICOPTER

The managers of one of the Norwegian whaling expeditions have ordered a helicopter from England, reports the August 1952 issue of *The Norwegian Whaling Gazette*. The helicopter will be used in the Antarctic during the 1952-53 whaling operations.

PORTUGUESE COMPANY TUNA FISHING

An Averio (Portugal) fishing company has purchased two American submarine chasers for use in tuna fishing, reports an August 29 American Embassy dispatch from Lisbon. Press reports indicate that the vessels are equipped with two 900 hp motors, and have refrigerated compartments with a capacity of 450 metric tons of fish.

One of these vessels completed a successful trial run on August 26 and both are expected to leave shortly to fish with lines in the area of the Canary Islands.

Except for a few small boats operating from the Cabo Verde Islands, Portuguese tuna fishing has been limited to about three months a year when (May-August) tuna are caught by traps off the Algarve coast. These fish, with dark meat, are sold mainly to Italy. Use of powerful fishing craft and line fishing should make possible a year-round supply of tuna, of which a major proportion would be of the white-meat variety acceptable to the American market.

OPS DECONTROLS FISHERY PRODUCTS

Certain canned fishery products specialties on October 1 were decontrolled by OPS. General overriding Regulation 7, Revision 1, Amendment 10, decontrolled certain food and restaurant commodities, including the following sea-food products: all canned whole clams (formerly only canned whole Maine clams were decontrolled); canned smoked oysters; canned deviled crab meat; canned lobster a la Newburg; canned shrimp a la Newburg; canned shad; canned turtle or terrapin; canned anchovy roll fillets; canned turtle soup (wine flavored); and fish or sea-food soup (except clam chowder). In addition, all types of frozen soups and antipasto (including those made with fish or shellfish ingredients) were decontrolled.

FROZEN FOOD DISTRIBUTION

A booklet to aid frozen food wholesalers in planning improved distribution plant facilities has been issued by the production and marketing administration, U. S. Department of Agriculture. This booklet advises the wholesaler on various methods of selecting operating facilities, comparative methods and facilities for assembling orders, suggestions for planning the plant layout, and considerations for selecting and using materials-handling equipment. Copies of *Planning a Wholesale Frozen Food Distribution Plant*, by J. A. Mixon and J. S. Larson, marketing research report No. 18, may be purchased for 35 cents from the Superintendent of Documents, Washington 25, D. C.

CHILE FISH MEAL AND OIL PROJECT

Chilean authorities are considering the proposal of a German corporation to establish a factory which would produce 3,000 metric tons of fish meal and 800 to 900 tons of fish oil annually, states the October 4 issue of *Foreign Trade* of the Canadian Department of Trade and Commerce.

The new industry would have a capital equivalent of Ch.$16 million (US $826,000) in cash and in value of imported machinery. A number of Chilean factories are already producing fish meal and oil, but their total production of about 5,000 tons is not considered to be sufficient for domestic consumption.

PERU BAIT-FISHING PERMITS

There have been some reports of the

(Continued on page 22)

TUNA COMMISSION studies The Bait Fishes

By

GERALD V. HOWARD

Senior Scientist

Inter-American Tropical Tuna Commission

IN recent years, the tuna and bait fish stocks in the Eastern Pacific have been subjected to a rapidly increasing commercial fishery. This gives rise to questions concerning their maximum utilization, or the maximum amount the stocks may be fished and yet maintain a sustained yield year after year. These questions were largely responsible for the establishment of the Inter-American Tropical Tuna Commission. This organization was brought into being by a convention between the United States and Costa Rica, which entered into force in March 1950.

The Convention directs the Inter-American Tropical Tuna Commission to gather and interpret factual information in order to facilitate maintaining the tuna and tuna bait fish populations at levels which will permit maximum catches year after year. The Commission's scientific staff, under the direction of Dr. M. B. Schaefer, began its studies in 1951. Because of limitation of funds appropriated to the Commission, researches so far undertaken are less extensive than might be desired, but due largely to the magnificent cooperation of the tuna fishing fleet, some of the studies are progressing rather well.

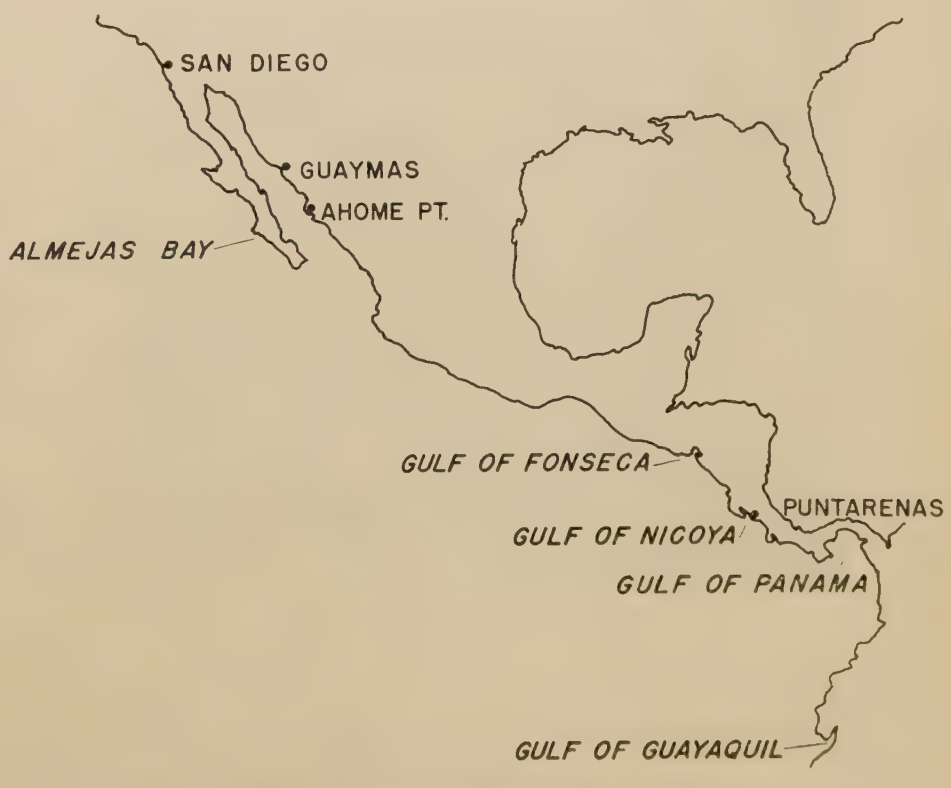
We are taking this opportunity to discuss some of the studies being undertaken by the Tuna Commission dealing with the bait fish resources. This work is of high priority because over 80 per cent of the tropical tunas (yellowfin and skipjack) caught in the Eastern Pacific are taken by means of live-bait fishing. For fishermen using this method, success in catching tuna is, in a large measure, dependent upon prior success in obtaining sufficient quantities of bait.

Several kinds of small fish are used for bait. They are found in bays and estuaries from California to Ecuador and around the Galapagos Islands. The most important species in tropical waters is the anchoveta *(Cetengraulis mysticetus)*. This fish is caught in Almejas Bay on the outer coast of Baja California, in the Gulf of California, various bays along the coast of Mexico, the Gulf of Fonesca, the Gulf of Panama, and along the coast of Colombia. The Gulf of Guayaquil in Ecuador supports a large population, but the area was closed to foreign vessels about one year ago. Costa Rica's Gulf of Nicoya was an important source until the anchoveta disappeared about 1948.

Large quantities of California sardine and northern anchovy are used for bait, but only in the more northern part of the tuna fishery. Sardines are also utilized in the Galapagos Islands, together with two fishes of the family Xenichthyidae, which the fishermen call "salima." Of minor importance are the thread herring and the flat iron herring of the genera *Opisthonema* and *Ilisha*, several species of the anchovy family, and the threadfin or "bobo" (*Polydactylus* spp.). These and a few other fish are used for live bait when the preferred species are unavailable.

The anchoveta is the most important

(Continued on page 22)



Principal Anchoveta Baiting Locations

Know Your Seafoods

LARGE VARIETY OF DAILY MENUS

THE TUNA RESEARCH FOUNDATION

Those Sunday night buffet suppers call for something just a little special in the way of good food. With the pennies you'll save by stocking up on canned tuna you'll be able to afford those extra touches that give you the enviable reputation of expert chef.

Whether or not you have a chafing dish, you'll want to try this delicious Tuna Scotch served over buttered toast. Add a generous portion of tossed salad to the serving platter for a well-rounded meal.

TUNA SCOTCH IN CHAFING DISH

(Makes 4-6 servings)

- 1 chicken bouillon cube
- ½ cup boiling water
- 4 egg yolks
- ¼ cup California sherry wine
- 1 tablespoon chopped parsley
- 1 tablespoon minced onion
- 1 cup heavy cream, scalded
- Dash cayenne
- ½ teaspoon paprika
- Salt and pepper to taste
- 1 7-ounce can solid-pack tuna, drained
- 1 3-ounce can mushroom caps, drained
- 12 fresh or frozen oysters
- Buttered toast

In the top pan of a 1-quart chafing dish (or double boiler), dissolve bouillon cube in boiling water. Beat egg yolks slightly with sherry; add parsley and onion. Gradually stir egg yolk mixture into bouillon and bring to a boil over direct heat, stirring constantly. Place over hot water pan; add scalded cream and seasonings. Cook 3 minutes, stirring constantly. Add tuna which has been broken into large pieces, mushrooms and oysters; heat thoroughly. Serve over buttered toast.

TUNA SCOTCH CHAFING DISH

TUNA MUSHROOM AND GRAPEFRUIT SALAD

(Makes 6 servings)

- 2 7-ounce cans solid-pack tuna
- 1 4-ounce can sliced mushrooms, drained
- ½ cup chopped celery
- 1 cup canned grapefruit sections, cut up
- ¼ cup oil, drained from tuna
- 1 tablespoon fresh or bottled lemon juice
- ¼ teaspoon salt
- Dash pepper
- Dash paprika
- 1 teaspoon sugar

Drain tuna and reserve oil; break tuna into large pieces with fork. In a bowl, combine tuna, mushrooms, celery and grapefruit. In a jar, combine remaining ingredients; shake well to blend. Pour dressing over tuna mixture; toss lightly but thoroughly. Chill. Serve on crisp salad greens.

GOURMET'S HOT TUNA CANAPE

(Makes about 1 cup canape spread)

- ¼ cup chunk-style tuna, drained
- 1 hard-cooked egg, chopped
- 1 tablespoon finely chopped green pepper
- 6 anchovies, chopped
- 3 tablespoons diced fresh tomato
- Dash Worcestershire sauce
- 1 tablespoon chili sauce
- 1 tablespoon mayonnaise
- Toast rounds

With a fork, separate tuna into small pieces. In a bowl, combine tuna, egg, green pepper, anchovies, tomato, Worcestershire sauce, chili sauce and mayonnaise. Spread on toast rounds. Place on rack and broil until piping hot. Serve immediately.

TUNA TIMBALES WITH LEMON BUTTER SAUCE

(Makes 4 servings)

- ¼ cup milk, scalded
- 2 eggs, slightly beaten
- 1 tablespoon melted butter or margarine
- ¼ cup soft bread crumbs
- 1 6½-ounce can chunk-style tuna
- ½ teaspoon salt
- Dash freshly ground pepper
- Dash paprika

With a fork, separate tuna into small pieces. In a bowl, gradually stir scalded milk into beaten eggs. Add melted butter or margarine, bread crumbs, tuna and seasonings; mix well. Turn into 4 buttered custard cups or timbale molds. Place in pan of hot water. Bake in moderate oven (350°) ½ hour, or until knife inserted in center comes out clean. Unmold and serve with Lemon Butter Sauce.

To make Lemon Butter Sauce: In a saucepan, melt ½ cup butter or margarine. Add 2 tablespoons fresh or bottled lemon juice and 1 tablespoon finely chopped parsley. Serve over Tuna Timbales.

Receipes Kitchen-Tested in the Home Economics Department of . . .
Theodore R. Sills Company, 137 East 57th Street, New York 22, N. Y.

Congratulations

to the

FRENCH SARDINE COMPANY

Terminal Island **California**

We extend our sincere best wishes for now and the future to the FRENCH SARDINE COMPANY, on the opening of its beautiful new plant at Terminal Island. This event marks an important step in the continued expansion and prosperity of California's great Commercial Fishing Industry.

Happy holiday season

NOTICE—Cosimo A. Cutri, President of the Cutri Insurance Agency, announces the appointment of his two sons, Cosimo L. Cutri and Joseph G. Cutri, now associated with him, and welcomes their many friends to call for any service matters.

Cosimo A. Cutri, Pres.

Cutri Insurance Agency

MARINE insurance . . . GENERAL insurance . . . LIFE insurance . . . ANNUITIES

Suite 1016 Phone M-0174 *5TH & BROADWAY*

FIRST NATIONAL BANK BLDG. SAN DIEGO, CALIF.

PROGRESS & PRODUCTION

C. B. "Charlie" Foster
Sales Manager

APPOINTMENT

C. B. "Charlie" Foster has been appointed to the newly created position of Sales Manager—Engines for Cummins Engine Company, Inc., at Columbus, Indiana, according to an announcement by C. R. Boll, General Sales Manager of the company.

In his new capacity, Mr. Foster will continue to be in charge of all government contract work and, in addition, will take over the duties of the former position of Manager—Engine Sales.

Mr. Foster joined the company in 1950 as National Accounts Representative. He first had his headquarters at Chicago and later moved to Columbus. In 1951 he was appointed Manager—Contract Sales, which position he has held until this promotion.

Mr. Foster brings a wealth of experience in the heavy-duty equipment field to his new position. Immediately prior to joining the Cummins family, he was assistant to the operating vice president of the Truax-Traer Coal Company, a position which he accepted after having been assistant to the vice president in charge of sales of the Bucyrus-Erie Company for a number of years.

Mr. Foster graduated from Purdue University in 1926 with a degree of Bachelor of Science in Chemical Engineering.

POWERFUL HANDLAMP

The GS Model 22 is a durable 7½ volt powered handlamp. May be used anywhere, as a trouble, work or emergency light, either indoors or outdoors, for the shop, plant, laboratory, hospital, hotel, truck, auto or home use.

The unit is fitted with a rubber grip handle, two way fingertip switch control, 3 C.P. on low beam and 21 C.P. on high beam. (Sealed beam available.)

Non-corrosive aluminum bracket, chrome plated head and reflector, 6 inch adjustable head. Model GS 22 (less battery) $12.50. Battery, 7½ volt $4.15.

For complete information or trial order write to General Scientific Equipment Co., 2700 W. Huntingdon Street, Philadelphia 32, Pa.

AQUA-TUF "NEW" PAPER

Rhinelander Paper Company, Rhinelander, Wis., announces that their well-known Aqua-Tuf Glassines and Greaseproofs are now available not only in greatly increased quantity but also in a much wider variety of grades. This is because Rhinelander's new and most versatile Number Eight paper machine has been equipped to produce Aqua-Tuf (Rhinelander's trade name for its wet strength grades). Thus, these two useful functions of wet strength and grease-resistance may be teamed together with almost any combination of highly variable paper qualities that are characteristic of glassine and greaseproof because they are so largely "custom-built."

Aqua-Tuf is highly recommended for use as vegetable wrap, butter or shortening wrap, poultry wrap, giblet wrap, fish wrap, milk can gasket, cap for bulk ice cream containers, and various other uses where there is both a grease problem and the existence of a high degree of liquid moisture.

For samples and prices write to the Rhinelander Paper Company, Rhinelander, Wisconsin.

NEW AMMONIA COMPRESOR

Visitors to the Dairy Industries Exposition in Chicago September 22 to 27 witnessed the first showing of a new ammonia compressor of up to 200 tons capacity manufactured by The Creamery Package Mfg. Company of Chicago. The new model is called the 6H Type "K" Ammonia Compressor, and is the largest of CP's Type "K" Multi-cylinder Compressors.

The 6H is compact in design and requires no more floor space than many lower capacity compressors. It incorporates all the features of other CP Type "K" compressors, including full water-jacketed cylinders, water-cooled seal bearing, oil cooler, forced-feed lubrication, automatic capacity control, unloaded starting and CP shaft seal.

The 6H is a 6 cylinder, 6¾x5 compressor. At 20 pounds suction line pressure and 155 pounds condenser pressure, it produces over 108 tons of refrigeration; with suction pressure at 45 pounds, it will produce 209 tons. It is sturdily built and engineered for years of top efficiency service. Descriptive Bulletin is available from The Creamery Package Mfg. Company, 1243 W. Washington Blvd., Chicago 6, Illinois.

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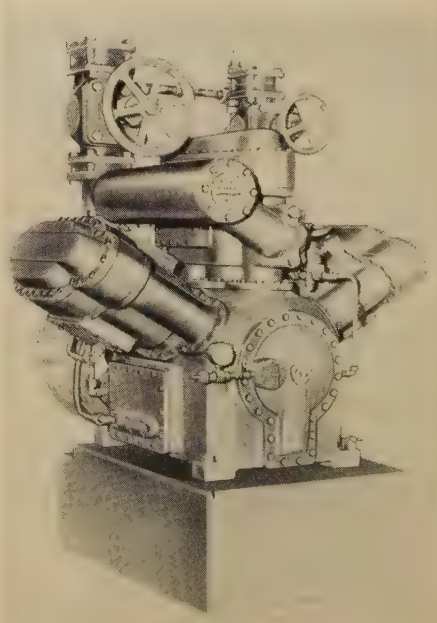
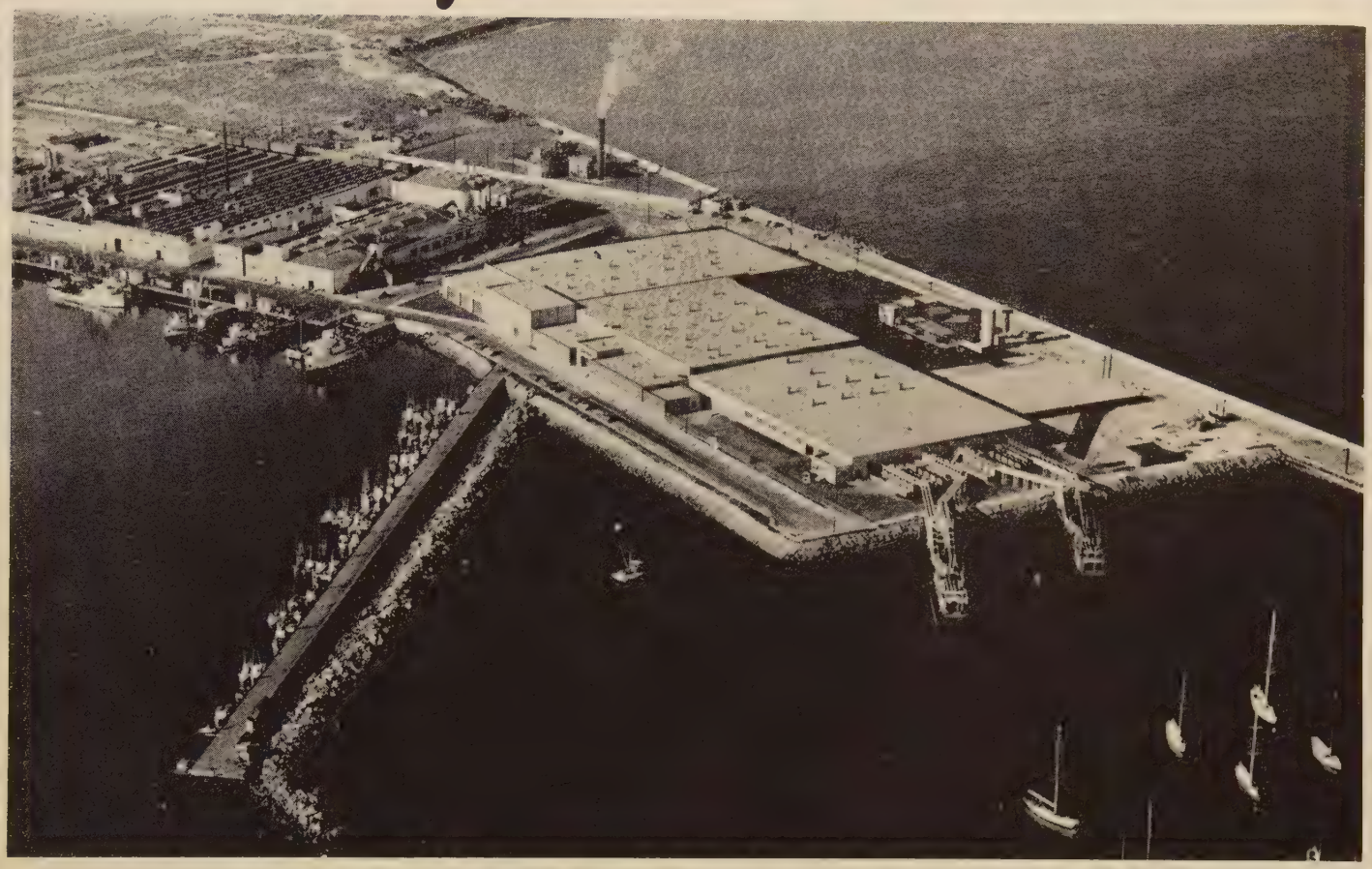


Congratulations



to the FRENCH SARDINE COMPANY

. . . on the opening of its splendid new plant marking an important advance in California's Commercial Fishing Industry. We are proud of our part in the design and the construction supervision of this modern plant—the largest fish processing unit and cannery in the world.

Design and Construction Under Supervision of the

M. A. NISHKIAN & CO.

ENGINEERS

DESIGNERS
INDUSTRIAL PLANTS
STEAM & POWER

MEMBER A.S.M.E.

FOOD PROCESSING
GAS & COMPRESSOR
CONSTRUCTION
SURVEYS

CONSULTANTS

APPRAISALS
ENGINEERING REPORTS
ECONOMIC STUDIES

2360 AMERICAN AVENUE **LONG BEACH 6, CALIFORNIA**

MANCO CONSTRUCTION COMPANY

Subsidiary of the M. A. NISHKIAN & CO.

☆ STAR-KIST ☆

Multi-Million Dollar Enterprise

☆ ☆ ☆

Every company, large or small has a beginning . . . beginnings are sometimes humble . . . sometimes flamboyant. Martin J. Bogdanovich's beginning was a humble one. When a young man he adopted the United States as his home and country . . . believing the promise of the Constitution . . . in the opportunity it proffered him.

"Tuna's Finest Home," the new Star-Kist cannery, is a tribute to his faith and tenacity: a monument of concrete and steel to a true American . . . whose life is a living testament that the United States is indeed a land of opportunity to those who keep faith with principles and work hard to attain goals.

Martin Bogdanovich, founder of the French Sardine Company, was born on the Isle of Vis off the coast of Jugoslavia on November 5, 1882. He was educated in the public schools of that country. After a four year tour of duty in the Austrian Navy he migrated to the United States with his wife, arriving here in September, 1908.

He had little money. He settled in San Pedro and became a fisherman, first for someone else; then for himself in a boat he struggled and saved to purchase so he could become independent. In a small way he revolutionized the fishing industry. He was the first to use quantities of crushed ice to keep his fish fresh. An idea that allowed him to stay at sea longer and catch more fish. Other fishermen followed his lead. Today it's common practice. In 1914 he opened a market, the California Fish Company, and began buying fish from other fishermen and building a fair sized business.

In 1917 he took his savings and invested them in a cannery. He started his business with four other partners. When the recession struck after the first World War, he alone had the faith to stick out the rough going. He worked hard, his family worked hard, each member contributing to make the company live. The present president of Star-Kist, Joseph J. Bogdanovich sold papers and contributed the earnings to the support of the family. After selling papers in the evening he too went to the cannery and worked with other members of the Bogdanovich family.

Joseph J. Bogdanovich
President

All the hard work paid, the company managed to surmount obstacle after obstacle . . . to reach a place of prominence in American industry.

Martin Bogdanovich's life was cut short at a point when his plants at San Pedro and San Diego were running at top speed. He died performing an act of devotion to his adopted country during a War Bond rally in June 1944.

Joseph Bogdanovich succeeded his father as president and has taken the company forward to greater accomplishment in the best traditions of his father.

Joseph J. Bogdanovich became president of the French Sardine Company on the death of his father in 1944. He had been associated with the organization since his youth. When a child he worked in the can room and did general errands for his father.

A graduate of the public schools of San Pedro, he attended the University of Southern California where he was a member of the Chi Phi Fraternity and the Blue Key Club, an honorary scholastic and social organization. He majored in business administration.

After the completion of his junior year in college he made four trips as a member of a crew on a tuna clipper, and at one time had ambitions to be a fisherman. He returned to school in September 1934 to complete his education but left school in mid-term to enter his father's company as administrative assistant and trouble-shooter. His activities in the company up to the time of his father's death centered around the promotion of the STAR-KIST label, on a national basis.

At the time of his father's death the company was in the process of expanding their facilities and forming a national sales organization all of which has been accomplished through Mr. Bogdanovich's personal effort. They also undertook a comprehensive advertising and sales promotion program which overnight placed them in a position of national importance in the fishing industry.

The new STAR-KIST cannery, "Tuna's Finest Home" is a tribute to the far-sightedness not only of Martin J. Bogdanovich but his son, Joseph Bogdanovich, who is largely responsible for the present position of French Sardine Company in the food industry.

Joseph Bogdanovich is married and has three children . . . all boys: Martin, Robert, and Joseph, Jr.

(See Next Page for STAR-KIST STORY)

Star-Kist WORLD'S LARGEST Tuna Packing Plant

By

M. A. NISHKIAN
Consulting Engineer

JOSEPH ZELSON
Mechanical Engineer

M. A. NISHKIAN & CO.

M. A. Nishkian

"New Automatic Plant Cuts Costs . . . Schedules Million Can Daily Run . . . with Special Job-Designed Process Equipment . . . Conveying System . . . and Latest Control Instrumentation . . . Unified by Ultra-Modern, Economical Pre-cast Concrete Building."

THE new multi-million dollar Star-Kist plant in Fish Harbor, California, is a marvel of functional layout and high-speed automatic processing equipment. From cargo to can, every step of the giant operation, including by-product disposal, is planned to provide an unimpeded, continuous flow of materials through specially designed and superbly sanitary processing equipment. And almost literally, the five acre single-story pre-formed concrete building is poured around the process!

Foundation Problem

Amazingly, the entire massive structure is supported on hundreds of piles reaching down 40 to 60 feet through dredge filled bay. Even the land for the plant site had to be bailed out of the bay . . . rock dikes bounding over three hundred and fifty thousand cubic yards of sand dredged fill! Because of this consideration, preliminary soil investigations were particularly important and unusually extensive. Probable settlement and the ability of the substructure to support the piling could be determined only from the characteristics of the soil below the fill. Approximately six hundred creosoted timber piles were driven to refusal within 10 to 15 feet of the original surface, a foundation arrangement that provides maximum static stability and remarkably high resistance to earthquake forces.

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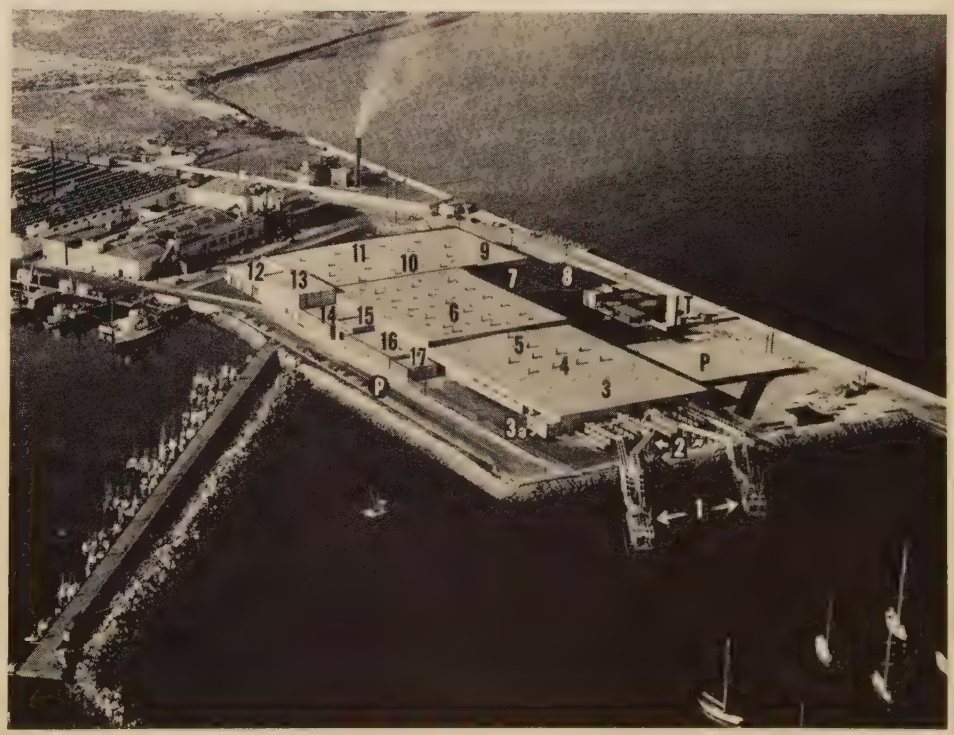


Structural Layout Planned for Efficient In-Line Production

1. Docks; 2. Thaw Tanks; 3. Butchering; 3A. Head butcher office; 4. Pre-cooking; 5. Cooling Room; 6. Cleaning and Packing Room; 7. Can Washer; 8. Retort Area; 9. Cooling Room B and Labeler; 10. Warehouse; 11. Loading Rail Spur; 12. Truck Loading and Unloading; 13. Empty Can Storage and Unscramblers; 14. Cafeteria; 15. Entrance; 16. Women's Locker and Washroom; 17. Nurses Quarters; T. Tank and Transformer Area; P. Parking . . . Design and Construction Supervision by M. A. Nishkian & Co., Engineers, Long Beach, California.

Functional Structure

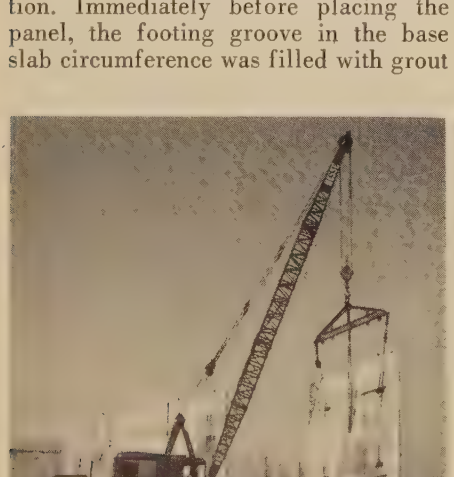
Huge reinforced concrete floor slabs were form-poured above the piling supports as a base to the plant building. The clean economical design of large area, poured concrete foundations eliminate differential settling, enhance overall stability and provide for maintenance-free, highly sanitary usage. In general, the plant structure incorporates non-bearing reinforced concrete walls, structural steel interior columns, prefabricated steel trusses, wood roof joists and diagonal sheeting with built-up roofing. The end effect is spacious high-ceilinged simplicity . . . with dividends of light, uncluttered cleanliness, and flexibility utilized large floor areas.

Sectional wall construction is the advanced engineering key to the attractive architectural continuity and blending lines of this plant. Over two hundred "tilt-up" type pre-cast panels were used in the construction, some as large as 20 feet by 34 feet . . . and weighing 30 tons! In "tilt-up" designed construction, a shear key at the base and poured pilasters provide bonding and continuity.

"Tilt-Up" Technique

The modern architectural usage of "tilt-up" design requires special construction equipment and techniques that were particularly interesting in that they promised . . . and fulfilled . . . a 40% savings over the cost of conventionally poured concrete.

As a first step, wall panels of 3000 pounds specification concrete were poured into forms resting on the floor slabs. A bond breaking technique using the Hunts Process agent prevents adhesion between the panel and the floor slab and breaks the suction between them. The panels were allowed to cure for seven days before erection and the erection stress was limited to 75% of the concrete test at the time of the erection. Immediately before placing the panel, the footing groove in the base slab circumference was filled with grout



Tilt-Up Slab

Concrete Slab

which served as an adhesive between the base and the panel.

As shown in the accompanying photographs, wall panels were then crane-raised and temporarily shored while column forms and reinforcing steel was located. As final steps, the columns were poured to the height of the lower cord of the trusses. After the trusses were in place, concrete was poured to join the adjacent panels up to the top of the parapet wall.

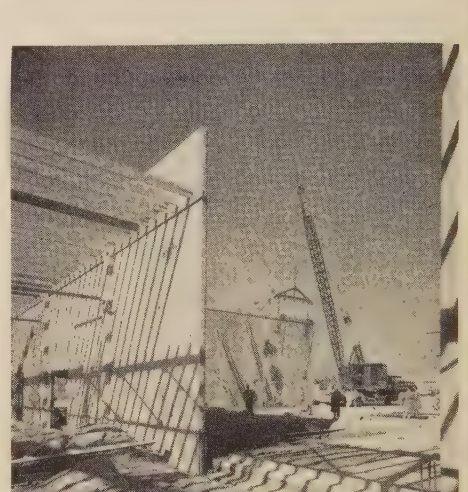
Some idea of the flexibility of this "tilt-up" system and its possibility for effecting enormous savings can be derived from consideration of one of the sections . . . a 25 ton preformed monster with two precision openings, seven-feet-four inches by fourteen-feet-eight inches and three-feet-six-inches by seven feet. The erection of this section was the most critical operation of the entire wall construction.

Operation Paul Bunyan!!

The most striking conception of the plant size and facilities can be taken from the simple consideration of the building materials involved: concrete 7,000 cubic yards . . . steel plate 900 tons . . . reinforcing steel 200 tons . . . stainless steel belting 30 tons . . . copper wiring 1 ton . . . motors 250 . . . starters and breakers 300 . . . transformers 10 . . . fluorescent and incandescent light fixtures 1200 . . . ventilating cans 40 . . . lumber over 1,000,000 board feet!

General utilities include an automatic sprinkler fire protection system, sewage expelsors, electrical conduits with sufficient connections, outlets and service to provide for future expansion, fresh and salt water systems and insulated piping for delivering some 60,000 pounds of processing steam per hour.

For the salt water supply, special fluming pumps, each rated at 3000 gallons per minute, are located by the piers. The vital supply of fresh water is assured even in the case of temporary city water main shut-off by a specially designed industrial water system utilizing 50,000 gallon stand-by storage tanks and pumps each capable



Shoring Walls

of delivering 2,000 gallons per minute to the processing area.

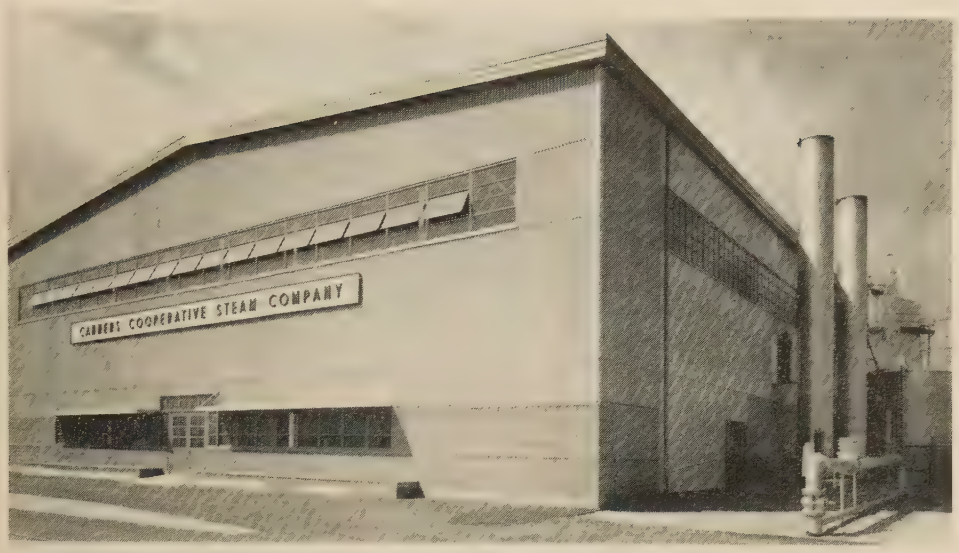
And what could be more pleasant than a continuous setting of soft background music for a cheerful working environment! Employees enjoy a specially modulated and accoustically situated public address system.

Central Steam Plant

Another interesting side note is involved in the supply of process steam to the Star-kist plant. When you consider that their requirements represent the equivalent of 2,000 boiler horse power, it might seem strange that no provision has been made for the boiler facilities. The answer is simple and unique. The steam that is used in the tuna processing is generated in the remotely located "Canners Cooperative Steam Co." plant, also designed by M. A. Nishkian and completed in 1951.

Cooperative Enterprise

With 400,000 #/hr. steam capacity and piping connections for an anticipated 50% expansion, the Canners Cooperative Steam Plant (see photo) provides process steam to the Star-Kist plant and to four other independent centrally located fish canneries under a joint ownership arrangement. Five otherwise keen competitors: California Marine Curing & Packing Company,



Cooperative Steam Plant

French Sardine Company (Star-Kist), South Coast Fisheries, Inc., Terminal Island Seafoods Co., Ltd., and Van Camp Seafood Company promoted this enterprise in the common interest of reducing production costs—each contributing one member to the governing Board of Directors. As additional economic incentive, the entire capital investment will be recovered in less than fifteen years—the bonus of increased operating efficiency.

Special Design Features

The four boilers are 3 drum bent tube, water cooled, suspended construction for 275 p.s.i.g. saturated steam and operate on both gas and oil. Normally, for economic reasons, they are gas fired, but when cold weather overload conditions require additional heating, the installation is designed to accommodate an unusually rapid change from gas to oil. This is facilitated by an arrangement for continuous re-circulation—preheating of the fuel oil.

Another unusual operating feature is the requirement for almost 100% make-up water. The steam used in processing becomes contaminated and cannot be recovered economically. This poses the enormous problem of treating up to 400,000 #/hr of incoming water of fluctuating analysis to provide food-safe process water, and to reduce the hardness for economic boiler operation. A completely automatic hot-lime, hot zealite softening and deaerating system and after-treat handles the requirements, and represents one of the first such installations in this part of the country.

The entire intra-plant steam distribution system, including special diaphragm expansion joints in the 16 inch diameter header, is laid underground—in all about 5500 feet! This lay-out is more remarkable in view of the utility services already entrenched along and across the selected route. A considerable corrosion and insulation problem was presented by the high water table and saturated ground. The desired pipeline protection was accomplished, using asphalted felt lined double aluminum jackets enclosing pearlite.

Proved Savings

For Star-Kist and each of the participating canneries, this modern steam plant represents a proved savings of over thirty per cent—a more than adequate justification for replacing numerous small capacity, aging units with facilities geared to the concept of utility operation.

". . . By Any Other Name . . ."

Skipjack, bluefin, yellowfin, albacore—it's all tuna. And it all finds its way from the refrigerated holds of rugged tuna clippers to the dock-side and scales of processing plants. Though individual fish weights vary considerably even within the same species, and some are delivered chilled while others are frozen, the Star-Kist plant is designed for automatic operation within the complete range of variation.

This is no small accomplishment. Just consider the factor of weights: skipjack, 6 to 18 pounds . . . albacore, 7 to 40 pounds . . . bluefin, 9 to 500 . . . and yellowfin ranging to 800 pounds. Meat characteristics vary quite as much both with size and specie variety, requiring unusual flexibility and automatic compensations in the various stages of processing.

From Clipper to Flumes

Two specially designed finger piers each 20 feet by 210 feet, provide complete docking and unloading facilities for four tuna clippers. Fish are dumped from large metal hoist buckets into a salt water flume which floats each batch on to an inclined slat conveyor to the Scale House. The slat conveyors are particularly interesting in a design that resists corrosion and handles the fish without bruising them. Both sides of the dual scale house are equipped to weigh different batches of fish simultaneously, speeding the unloading. Weights are taken and recorded automatically, and the fishermen are paid according to this weight.

To Thaw or Not to Thaw

That is a most important question,

(Continued on next page)

Docks—Thaw Tanks—Flume

and a good part of the special pier facilities are provided to answer it in a flexible, intelligent arrangement. After the fish have been weighed, the processing really begins, and that's particularly true because they are not eviscerated or otherwise dressed aboard the fishing vessels. There is quite adequate reason for this, experience having proved that round fish refrigerate better than those that have been cleaned. It's important, too, because tuna bruise easily, and a bruise will cause spoilage after a refrigeration-thawing cycle.

The next, most direct step in the process is conveying the fish to the butchering tables. Ordinarily, when the fish are chilled but not frozen, they are flumed directly from the Scale House to the Butchering Tables. At periods of peak load occasionally, part of the fish may be diverted to wooden thaw tanks flanking the flume and adjacent to the butchery. This is the very same procedure that is used to defrost the tuna that arrive too frozen to be processed. Attendants merely shunt the frozen fish selectively into any of the numerous thaw tanks. The tanks are designed to receive the fish without bruising them and to sluice them through a guillotine side gate near the floor of the tank when they are ready for butchering. Attendants may operate these counterweighted guillotine gates from the catwalk above the thawing tanks by easily turning the manual cranks.

The view of the butchering tables gives the key to the thaw tank system. Fish ready for butchering are received from the main flume in the center. Those fish that have been inadvertantly permitted to flume directly to the butchery and that require intermediate thawing are placed on the return slat conveyor to the left which takes them to the thaw tanks. The conveyor on the right side is from the thawing tanks and handles the thawed fish released by the crank operating attendants. There is no waste motion and the butchers work only with fish that is in prime condition to be handled quickly and efficiently.

Butchering Tables

Pre-Cookers

Butchering

Each of the butchering tables is flanked by crews of rubber booted butchers wearing water-proof sanitary type plastic aprons. Their job is to belly-slit the fish, eviscerate them, to remove the gills, and to wash them thoroughly before placing them in the wire baskets and racks for pre-cooking. All this is integrated by the variable speed slat conveyor that serves as a butchering table. The side channels serve admirably for imparting serviceable rigidity and rugged character to the working table.

Scheduled Pre-Cooking

The wire baskets of dressed fish are placed in stacked racks and are rolled into steam pre-cookers. This cooking period is carefully determined relative to the size, the species and the initial temperature condition (fresh, iced or almost frozen) of the fish. This requires an intermediate grading operation in the Fish Room, where baskets of fish of equal weight are placed in the same racks. The temperature is maintained constant between 212 and 216 degrees Fahrenheit, depending on the loading conditions. For small to moderate sized fish, the cooking period varies from two to four hours, with additional periods added for "frost lag." Larger fish up to 250 pounds, for example, may require as much as 15 hours cooking time.

As in all other phases of the processing, modern instrumentation controls the process variables to assure a high standard uniform product. Pressure indicators and steam temperature recorder-controllers maintain the predetermined operating conditions in the steam cookers. Throttling valves on the steam inlet lines respond to the sensitive controller mechanism and automatically regulate the temperature. A 24 hour chart record of the temperature functions as an additional safeguard.

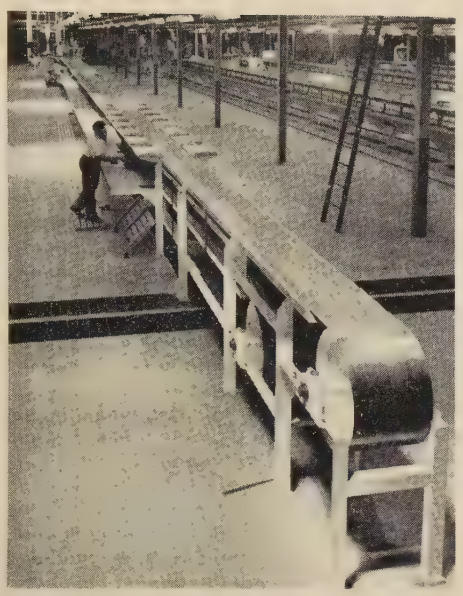
Natural Cooling

After undergoing a complete precook, the fish is withdrawn and the racks are wheeled into a special room for cooling. The in-line principle of processing is maintained in that the cooling room is in a straight line from the row of cookers. This is another instance of a functionally engineered process in which unhampered flow lines do much to eliminate wasted time and employee fatigue.

On an average, the cooked fish require over 12 hours for cooling at room temperature before they can be properly handled for cleaning. For premium results this period must not be hastened by refrigerated cooling.

Sanitation a la Sweden

For the cleaning operation the fish will be placed on one of seven remarkable stainless steel belts, each measuring 250 feet in length. The specially designed cleaning tables are unique in all of the canning industry, incorporating many features that impart high efficiency and ultra sanitation to the operation. In order to insure maximum cleanliness throughout the years, it was



Steel Belt

decided to consider only a non-porous, non-corroding, polished hard surfaced continuous belting, if such could be secured. It was a difficult search, primarily because the belting had to be properly dimensioned and unusually flexible. For this particular project alone, a special type of stainless ribbon-flex steel was imported from Sweden. Expense was a secondary consideration, because this design contributes heavily to the immaculate operation of the cleaning room.

Cleaning Operation

Long lines of women in white uniforms prepare the tuna for the canning operation to follow. They progressively clean the pre-cooked fish, starting by removing the head and tail. Then they scrape the skin off, remove the backbone and dark meat, and place the four clean loins of boneless meat on trays for the check inspection.

The lower belt serves the function of carrying the waste products back to the starting point of the belt. Adjacent to the cleaning table at this location is the cross-screw waste conveyor. A diversion plate on the lower stainless steel belting introduces all waste and by-product material off the return belt into the screw conveyor. The waste material is received from the screw conveyor by trucks outside of the plant.

Guillotine Uniformity

A second inspection preceeds the sizing of the loins for packing. A "Guillotine" knife machine cuts them crosswise into pieces of the proper size for solid pack canning.

Fillets

Cans, Cans, Everywhere

Cans are received in Canco Carriers and fed through the empty can booster conveyor to the empty can unscramblers on the mezzanine floor. Cans are merely dumped, quite unceremoniously into a hopper feeding the five foot wide elevator. Two completely automatic units unscramble the cans and discharge them, open top up, on a can conveying system that single files to separate conveyors.

These conveyors carry the cans to brush-offs and they then roll by gravity into special can washers or sterilizers leading to the Can Filling Machines.

Cleaning Tables

Screw Conveyor

Packing

Of all the specialized equipment designed for this project, the canning equipment qualifies as the most complex and yet the most completely automatic and meticulously sanitary. Every part of the process must be integrated into a swift sequence of operations that must be precisely controlled to maintain over-all quality. Preliminary to any further processing, a continuous supply of sterile empty cans must be on hand, and this is the logical place to describe the amazing can conveying, unscrambling and washing system as designed especially for the Star-Kist plant.

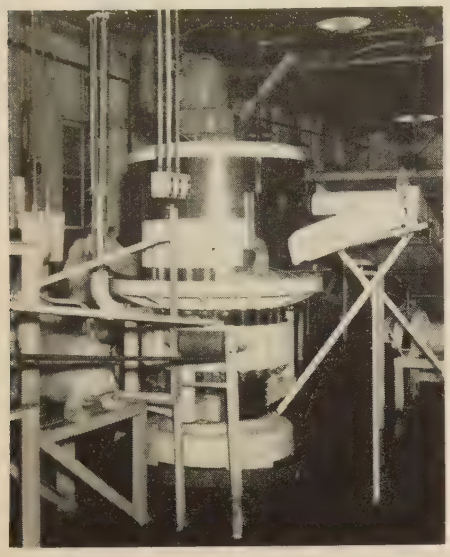
Filling Machines

The choice selection of guillotined chunk tuna is machine packed in cans that have been sterilized immediately before the filling operation. Shape packers handle the remaining tuna. Several of the photographs show both ma-

(Continued on next page)

Weigh Station

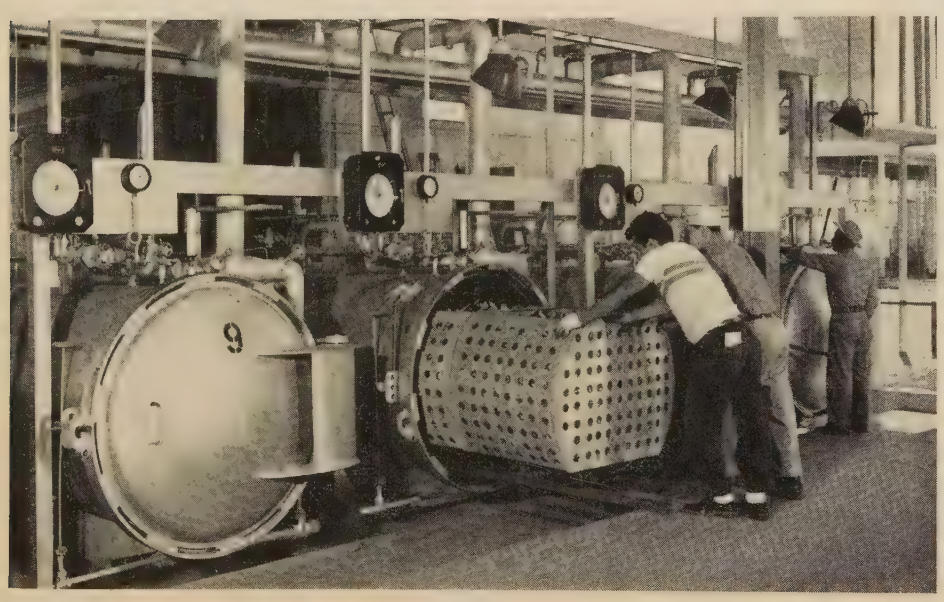
chines. The next step requires weight checking by a group of inspectors, to assure meeting the high standards of weight tolerance demanded by the Star-Kist management. From this point the moving line of cans comes under the oiling and salting section of the Sealer. Among the many features that indicate the painstaking development of the process are the individual oil heaters which prepare the finest oils for slow measured delivery which salts the tuna to accentuate the flavor. Spillage oil is recovered and clarified in a separate centrifugal system.



Pak-Former

The cans are then sealed automatically and conveyed to the Full Can Booster Elevators which take the full cans to the Full Can Washers for another steam bath. The special Full Can Washer was especially designed for this service by M. A. Nishkian & Co. after extensive model and prototype runs in the modern laboratories of French Sardine Company. Splendid results have been obtained.

From the Full Can Washers the cans are transferred to retort baskets for their final flavor developing cooking period. The critical nature of this operation demands particular attention to the temperature scheduling and automatic controls are provided. A predetermined program for two or three definite periods at increasing temperatures is pre-set into each temperature controller operating with each retort. Of course the schedule differs for the different weight cans. The high retort temperature assures proper sterilization at the same time.

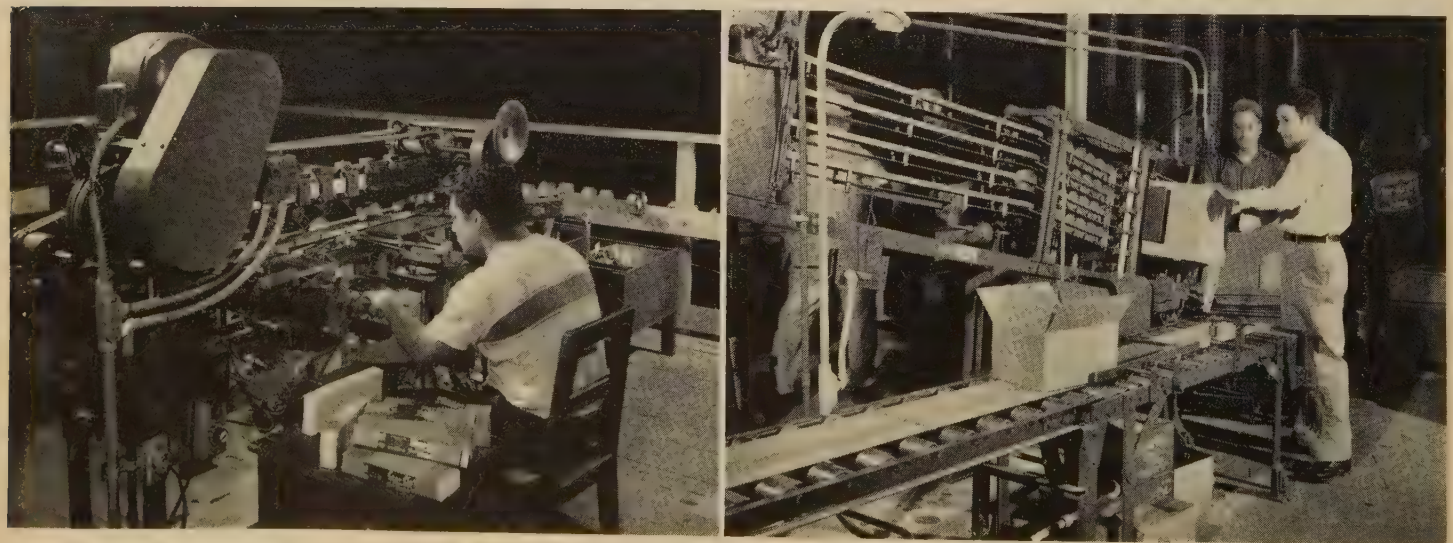


Retorts

Final Operations

When the cans are removed from the retorts, they are cooled and finally transferred to unscrambling machines. The single-filled cans then feed directly through automatic labeling machines into the advanced design casing machines. where a complete case is filled in one operation.

From warehouse to train and truck the cased tuna completes the processing begun scarcely the day before along side the finger docks that reach gracefully into the tuna port of Fish Harbor. Star-Kist, a model of engineered efficiency, cleanliness, and beauty.



Labeling and Casing Machines

Regime

(*Continued from page 7*)

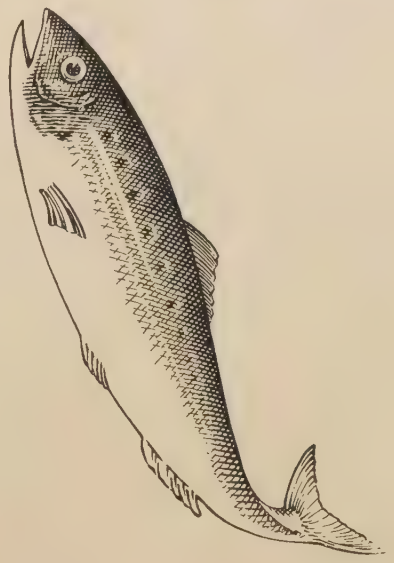
Article 4 is the stumbling block over which the 1930 Conference tripped. What follows this in the report defines what may be done and what may not be done by the sovereign in the territorial sea and how that sea will be measured. If you can't decide how wide the territorial sea is to be it is hard to decide the other things. Upon this it has been impossible as yet to get uniform agreement.

At the 1930 Conference those nations that carried 80 per cent of the world's seaborne commerce wished to agree on a territorial sea three marine miles wide. But they did not represent a majority of the nations present and the Conference failed to reach an agreement which would fix the breadth of the territorial sea for the future.

Mr. Francois suggests that it will be necessary for the "three mile" nations to make some concession to the other nations in order to get an agreement. He thinks six miles would be a satisfactory compromise. He realizes that the proponents of neither the narrow or the broad territorial sea will be easily satisfied by any compromise. He says: "It is clear, however, that in view of all the conflicting views which have been expressed on this matter, no agreement will be possible if neither side is prepared to make concessions. The champions of the freedom of the seas will have to realize that the general or the quasi-general acceptance of the six-mile rule—which has already been adopted by a number of states—would put a stop to any tendency to adopt unilaterally a still greater distance. Those states which fix the breadth of the territorial sea at six miles will always be free to conclude agreements among themselves recognizing the right to fish, on a basis of reciprocity, in those parts of the territorial sea beyond the three-mile limit. States will, of course, remain free to fix the breadth of the territorial sea at a distance of less than six miles. Those who favor a greater distance will have to realize that the adoption of the system of protecting marine resources recommended by the International Law Commission in the report drawn up at its third session, is likely to remove certain difficulties which they fear will result from a reduction of that zone; moreover, adoption of the six mile rule would not preclude the establishment of contiguous zones as provided for in the report of the International Law Commission for customs, fiscal and sanitary purposes."

Any extension of the territorial sea beyond three miles will hold the possibility of being harmful to the American Tuna Fisheries. While most tuna are caught six miles from a point of land, and the tendency in recent years has been to catch more of the tuna farther from land, nevertheless a considerable amount of tuna is caught here and there in the area between three and six miles from land. Accordingly the tuna industry would not be agreeable to giving up the rights it now enjoys under traditional law in this area unless it gained something for what it gave up.

On the other hand what a tuna fisherman wants most of all is to know precisely where he can go to prosecute his trade without being interfered with, and without getting into trouble. If a narrow band of territorial waters could be agreed upon among the countries of the



Eastern Tropical Pacific, if the method of measuring this could be agreed upon, and if the rights of the tuna fisherman both inside and outside this territorial sea could be decided definitely, then the tuna fisherman's relief would be so great that a mile or two this way or that on the breadth of the band would not worry him much.

Article 5 sets forth Mr. Francois opinion of what the International Court of Justice's decision in the Anglo-Norwegian Fishery Case has done to the method of locating the baseline from which the breadth of the territorial sea is measured.

In view of the fact that no part of the area fished by American tuna fishermen is either deeply indented or cut into, or is bordered by an archipelago, it would not appear that this decision would affect us. But at least one country we deal with has drawn a new base line, anyway, along its coast and has seized three tuna vessels for being in its territorial sea, as so measured, with out proper documents. Thus it would be most useful to us to have such an article which would delimit more closely the rights of both us and the nations of the Eastern Tropical Pacific. The same remarks can be made for articles 6, 7, and 8.

DRAFT REGULATION

CHAPTER I

General Provisions

Article 1

Meaning of the term "territorial sea"

The territory of a State includes a belt of sea described as the territorial sea.

Article 2

Juridical status of the territorial sea

Soverignty over this belt is exercised to the conditions prescribed by international law.

Article 3

Juridical status of the bed and subsoil

1. The territory of a coastal State also includes the bed of the territorial sea and the subsoil.

2. Nothing in the present Regulation prejudices any conventions or other rules of international law relating to the exercise of sovereignty in these domains.

CHAPTER II

Limits of the Territorial Sea

Article 4

Breadth

The breadth of the belt of sea defined in article 1 shall be fixed by the coastal State but may not exceed six marine miles.

Article 5

Base Line

1. As a general rule and subject to the provisions regarding bays and islands, the breadth of the territorial sea is measured from the line of low-water mark along the entire coast.

2. Nevertheless, where a coast is deeply indented and cut into, or where it is bordered by an archipelago, the base-line becomes independent of the low-water mark and the method of base-lines joining appropriate points on the coast must be employed. The drawing of base-lines must not depart to any appreciable extent from the general direction of the coast, and the sea areas lying within these lines must be sufficiently closely linked to the land domain to be subject to the regime of internal waters.

3. The line of low-water mark is that indicated on the charts officially used by the coastal State, provided the latter line does not appreciably depart from the line of mean low-water spring tides.

4. Elevations of the sea bed situated within the territorial sea, though only above water at low tide, are taken into consideration for the determination of the base line of the territorial sea.

Article 6

Bays

In the case of bays the coasts of which belong to a single State, the belt of territorial sea shall be measured from a straight line drawn across the opening of the bay. If the opening of the bay is more than ten miles wide, the line shall be drawn at the nearest point to the entrance at which the opening does not exceed ten miles.

Article 7

Ports

In determining the breadth of the territorial sea, in front of ports the outermost permanent harbour works shall be regarded as forming part of the coast.

Article 8

Roadsteads

Roadsteads used for the loading, unloading and anchoring of vessels, the limits of which have been fixed for that purpose by the coastal State, are included in the territorial sea of that State, although they may be situated partly outside the general belt of territorial sea. The coastal State must indicate the roadsteads actually so employed and the limits thereof.

Bait

(*Continued from page 9*)

of the bait fishes, not only because of its wide distribution, but because it lives aboard the tuna clippers better and longer than most other species. It appears to be more tolerant of changes in water temperature. Also, many fishermen tell us that it stands more crowding in the wells, so that the boats are able to carry greater quantities. These are important considerations for the clippers ranging far from shore and at great distances from the baiting grounds.

Problems of the Tuna Bait Fishery

As the tuna fishery in the Eastern Pacific has been growing for the last thirty or forty years, except for a period during World War II, the bait fishery has expanded in a like manner. A continuous need for more live bait gives rise to questions about the nature of the resource. People of the tuna industry, fishermen, boat owners, and canners alike, need to know: Are the bait fish populations affected by the fishery? Can the stocks support ever increasing demands? Are conservation measures necessary? Such questions may be summed up as follows: How may the bait fish resources, upon which the tuna industry depends, be best utilized in order to produce sustained maximum catches year after year? This question cannot be answered today. To answer it, we require rather complete knowledge of the biology of the bait fishes and of the environment in which they live, and of how the stocks are affected by the commercial fishery.

The Tuna Commission has commenced a reasearch program to obtain answers to the question of the rational utilization of the bait fish stocks. The studies do not yet include all the necessary lines of inquiry because, so far, the total annual appropriation of $59,000, allotted to the Commission for all its work, is only a fraction of the amount needed to conduct the investigations.

Success with the bait studies, and the rest of our investigations for that matter, depends to a great extent upon the continuing cooperation of captains and crews of the fishing vessels. Currently, most vessels keep detailed records of their fishing activities in logbooks provided by the Commission. This confidential information is being made available to our scientific staff by about 95 per cent of the bait boat fleet. The records include, among other things, the amount of bait caught and the time taken to catch it at each baiting place. Numerous skippers have also made available logbooks for back years—some having kept uninterrupted records for the last twenty years.

These fishing records assist in measuring, and eventually predicting, changes in abundance and yield of the bait fish populations in response to changes in fishing intensity. However, we cannot interpret such data without a sound knowledge of the life history of each species, together with rather detailed information about its environment and how changes in the latter affect them. We need to know how fast they grow, at what age they enter the fishery, where and at what age and season they spawn, what their feeding habits are, and so on. For each bait species, we must find out whether we are dealing with a single widespread stock or a series of independent or semi-independent populations. For example, if large quantities of anchoveta are being taken from, say, the Gulf of Panama, is this having any effect on the anchoveta population in the Gulf of Fonesca or some other locality? Can we expect replacements to come to Panama from Fonesca or elsewhere, and if so, when and to what extent? *(Continued in January)*

Flow

(*Continued from page 8*)

possibility of United States tuna-fishing vessels obtaining bait permits for fishing in the territorial waters of Peru. However, according to the latest information available, there is no provision in Peruvian law for issuance of bait permits to foreign fishing vessels. Also, there does not seem to be any possibility that a law permitting the issuance of bait permits will be enacted in the near future.

CANNED FISH SHORTAGE ANTICIPATED

A canned fish shortage is anticipated in the Philippines unless the government undertakes importation, according to an American Embassy dispatch from Manila dated September 17. Private Philippine importers are refraining from importation due to the certainty of losses on the basis of present ceiling prices set by the Philippine government.

The Philippine Director of Fisheries, in a memorandum to the Finance Secretary, warned that it was a mistake to think early development of local fisheries could supply the needs of the Philippines. In his opinion the continued importation of canned fish should not be curtailed during the next ten years.

Philippine fish requirements are estimated at 1.2 billion pounds annually while local production currently supplies only 660 million pounds annually.

PERUVIAN CANNERIES

A trade list of Peruvian canneries has been issued by the Commercial Intelligence Branch of the Office of International Trade. Canneries canning fish are included. Copies of *Canneries —Peru* may be purchased at $1.00 each by firms in the United States from the Office of International Trade, U. S. Department of Commerce, Washington 25, D. C., or from the department's field offices.

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Progress

(*Continued from page 12*)

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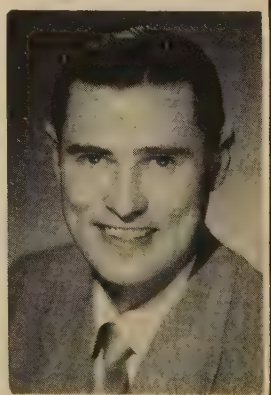

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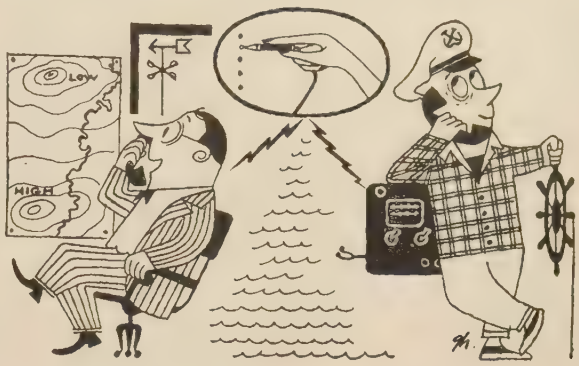

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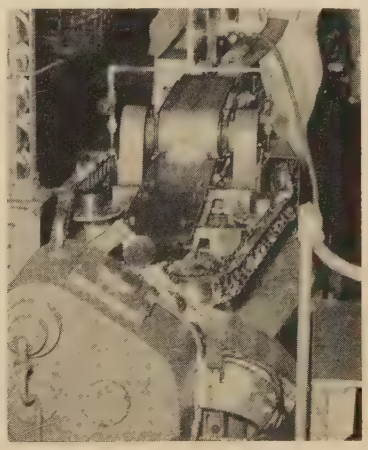

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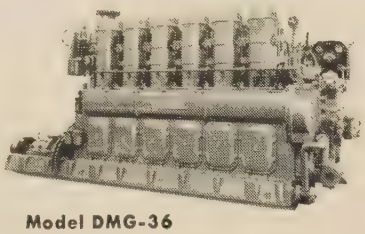

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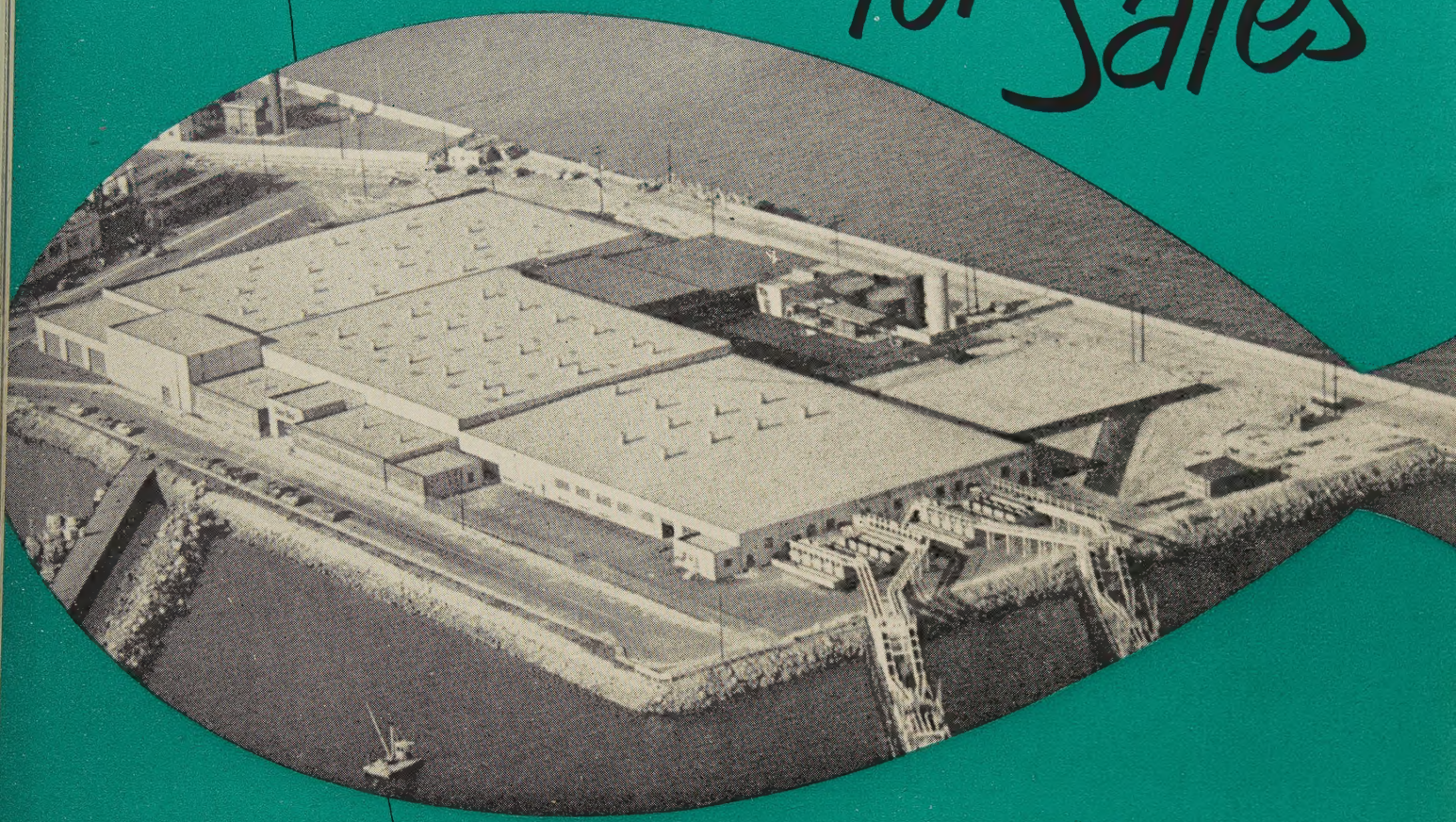

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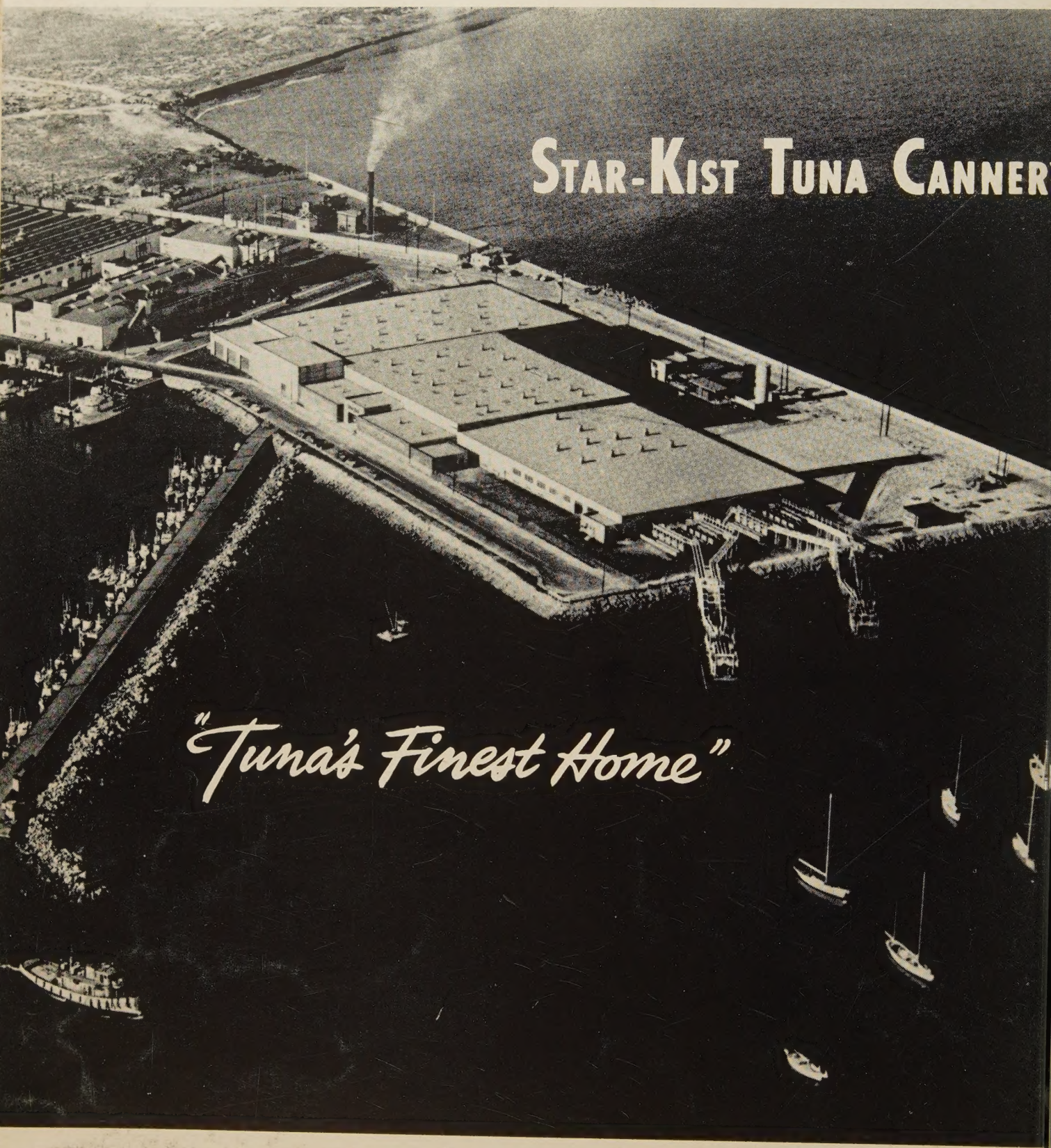

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